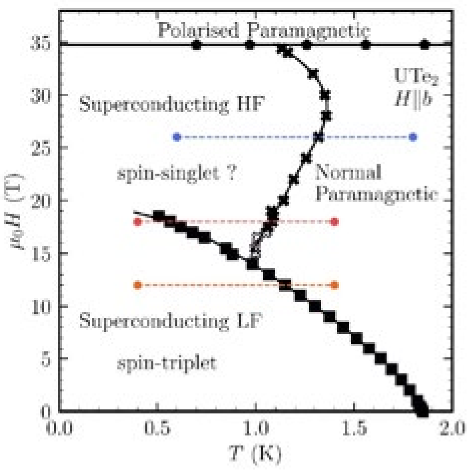
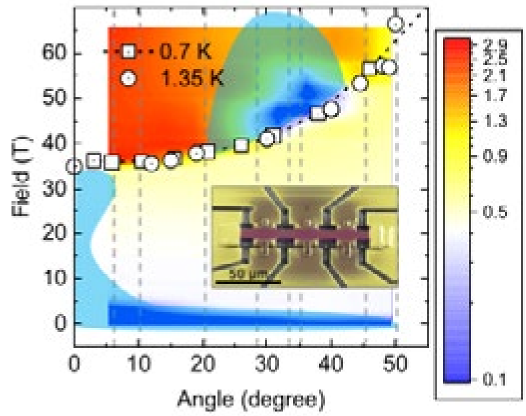
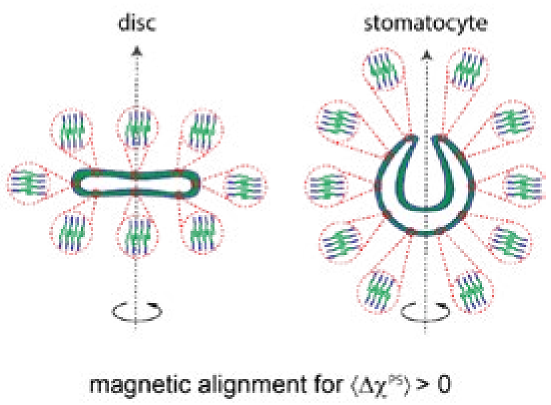
European Magnetic Field Laboratory

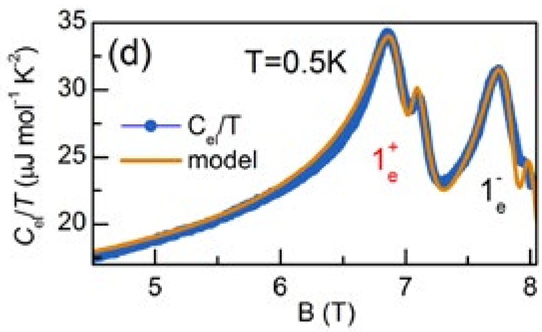
EMFLNEWS

N°1 2024









CONTENTS

DEAR READER

It is with great pleasure that we present the spring edition of EMFL-News, a unique opportunity to share with you the latest exciting developments from our international laboratory. In this issue, we again highlight recent scientific achievements of our research teams. As with every edition, we also have the privilege of introducing you to a distinguished member of our laboratories, and this time we feature Zilan Kilic from Nijmegen.

This edition particularly focuses on two aspects that are important to us at EMFL. First, we emphasize our continued commitment to supporting industrial activities involving intense magnetic fields. This issue features "Theva", a company that produces superconducting tapes. Further, we invite you to visit our facilities using newly produced virtual tours.

In Grenoble, the power-supply upgrade increased the power available for the magnets from 24 MW to 30 MW. In the years to come, this increase in power will translate into increased performance of the fields available to our users.

Furthermore, we are taking the opportunity to co-organize meetings and support conferences dedicated to intense magnetic fields in different countries. This year, our user meeting will be organized in the UK (Nottingham) on June 11, and next year with our new partner in Italy (Lecce) in June 2025. In addition, the HMF conference will be organized this year in Warsaw in September and the RHMF conference in July in Nijmegen.

We hope you will appreciate the dynamism and achievements of EMFL as described in this issue.

On behalf of the entire team, I wish you a very pleasant spring 2024.

Charles Simon
Director LNCMI
Chairman EMFL

MEET OUR PEOPLE

Zilan Kilic, HFML

Since September of last year, I can proudly call myself a member of the EMFL coordination team. My name is Zilan Kilic and I was born and raised in the Netherlands. I have a background in International Business and Communication. During my studies, I built a strong foundation in marketing principles and techniques, including market research, branding, and digital marketing. I completed my internship at Royal Philips as a CRM (customer relationship management) and audience management intern, where I gained valuable experience and improved my knowledge of online marketing. I pursued an international minor in Political Communication at the University of Agder in Norway.

For the previous three years, I have worked as a Project Manager for Tech and Energy at the East Netherlands Regional Investment Agency (Oost NL). Oost NL aims to promote the economic development of the Gelderland and Overijssel provinces by attracting foreign investments. As a project manager, I have supported entrepreneurs and organizations in the technology and energy sectors throughout the entire process of setting up businesses and fostering growth in our region. During my time at Oost NL, I have built a strong network and established valuable professional relationships.

Currently, I have the pleasure to work for EMFL and the Radboud University as an European project officer. I coordinate, together with all my colleagues in the EMFL coordination team, the daily tasks of EMFL. It is a true pleasure working with my European colleagues from all over our continent. I will be visiting HZDR soon for more in-person meetings and looking forward to it. Although I do not have a scientific background, the community has welcomed me with open arms. I am looking forward to meeting with you all; do not hesitate to reach out to me.

› *Zilan Kilic*

THE MAGNETIC ANISOTROPY OF POLYSTYRENE IN POLYMERSOMES

Sandra Kleuskens, HFML Nijmegen and IMM Radboud, Daniela Wilson, IMM Radboud, and Hans Engelkamp, HFML Nijmegen

Researchers of HFML-FELIX and the Radboud University have determined the magnetic anisotropy of polystyrene in poly-ethyleneglycol polystyrene polymersomes by magnetic birefringence and transmission electron microscopy. The magnetic anisotropy found is only a small fraction of what is theoretically predicted due to random coiling. Ordening polymers in the polymersome membrane can be essential to reduce the necessary magnetic field for applications.

Using the diamagnetic anisotropy of polymers for the characterization of polymers and their aggregates is a comparatively new approach in the field of soft-matter and polymer research. For crystals and individual molecules, obtaining the diamagnetic anisotropy is often relatively straightforward, either through experimental methods or computational calculations. However, a good and thorough quantitative description of the diamagnetic properties of polymer aggregates has been lacking due to their random nature. Using a simple equation, that links the magnetic properties of an average polymer-repeating unit to that of the polymer vesicle of any shape (disc, tube, rod, stomatocyte), we measured, using magnetic birefringence, the average diamagnetic anisotropy of a polystyrene (PS) repeating unit inside a poly(ethylene glycol)-polystyrene polymersome membrane as a function of the PS length and as function of the preparation method. All obtained values have a negative sign, which results into polymers tending to align perpendicularly to an applied magnetic field. The team found very similar anisotropies for all polymersome shapes, which shows that the individual polymers are organized very similar in each case. Moreover, the value found is only a fraction (~1 %) of what it could maximally be if the polymers were fully organized. Yet, it is sufficient to be useful in aligning and deforming various shapes of polymersomes, albeit at rather high fields. We, therefore, predict that further ordering of the polymers within the membrane will lead to similar responses at much lower magnetic fields, possibly obtainable with permanent magnets, which would be highly advantageous for practical applications.

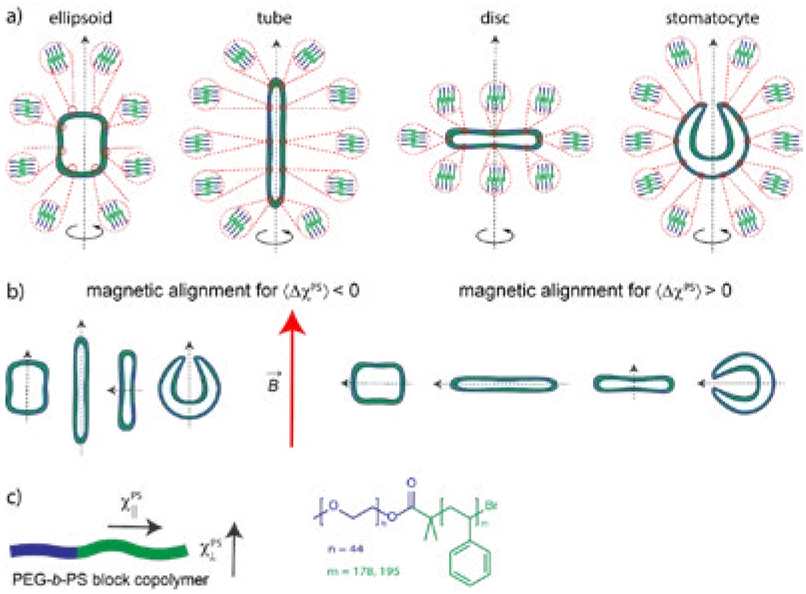


Figure: (a) Schematic images of an ellipsoid, a tube, a disc, and a stomatocyte. The distributions of the individual polymers are indicated at several positions. The ellipsoid, tube, and stomatocyte have most polymers perpendicular to the vesicles' symmetry axis (dashed arrow), while the disc has most polymers parallel to its symmetry axis. Therefore, a disc and an ellipsoid, a tube or a stomatocyte will align with their symmetry axis in opposite directions. The two possibilities are shown in (b). (c) Legend also shows how the magnetic anisotropy of polystyrene (PS) is defined with respect to the polymer.

The Average Magnetic Anisotropy of Polystyrene in Polymersomes Self-Assembled from Poly(Ethylene Glycol)-b-Polystyrene, R. S. M. Rikken, S. Kleuskens, L. K. E. A. Abdelmohsen, H. Engelkamp, R. J. M. Nolte, J. C. Maan, J. C. M. van Hest, D. A. Wilson, and P. C. M. Christianen, Soft Matter **20**, 730 (2024).

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TUNING THE PAIRING MECHANISM OF A SUPERCONDUCTOR

Adrien Rosuel, Christophe Marcenat, Georg Knebel, Jean-Pascal Brison, Phéliqs Grenoble, Thierry Klein, Institut Néel, Grenoble, Dai Aoki, Tohoku University, Albin Demuer, and Gabriel Seyfarth, LNCMI-Grenoble

The discovery that superconductivity can also be induced by direct interactions between electrons, for example mediated by their magnetic properties, was a real breakthrough. However, a precise identification of this pairing mechanism remains a major challenge. In high-T_c cuprates, for example, still no consensus exists on which interactions control the formation of the Cooper pairs.

Recently, we have shown in a collaboration of Phéliqs, Néel Institute, the LNCMI Grenoble, and Tohoku University that the strongly correlated system, UTe_2, is the first one, for which two different pairing mechanisms can lead to different superconducting (sc) states. Moreover, a magnetic field can tune, which mechanism will drive the sc state.

The team discovered that the anomaly, i.e., the specific-heat jump, which marks the transition between the normal and the sc state, broadens more than 4 times in the field-reinforced state. This is unique: in the very few other examples of superconductors displaying multiple sc phases, the sc states differ only by a change of symmetry, and in such a case, there is no remarkable change of the specific-heat anomaly. Here, in UTe_2 it is likely that the low-field spin-triplet sc phase is driven by ferromagnetic fluctuations, whereas the high-field phase with a broad specific-heat anomaly emerges from other magnetic fluctuations developing under magnetic field.

A peculiarity of the phase diagram of UTe_2 (figure) is that the field-reinforced sc state abruptly disappears above 35 T, coinciding with a first-order metamagnetic transition. The mentioned "other" magnetic fluctuations are most likely related to the emergence of the metamagnetic transition. Detailed analysis shows that a pairing mechanism controlled by the metamagnetic field could explain quantitatively the strong broadening of the specific-heat anomaly, as well as its high sensitivity to a small misalignment of the field from the b axis. However, surprisingly, the high-field phase, contrary to the low-field one, would be spin singlet. This is counter-intuitive: a spin-singlet state for the Cooper pairs is usually detrimental for superconductivity at high magnetic field, because of the loss of magnetic energy due to the alignment of spins in the field. At the opposite, a triplet state allows to form Cooper pairs with spins polarized along the applied magnetic field; hence, it should be favored at high fields.

Nevertheless, this additional twist is consistent with some theoretical predictions studying precisely the competition of different pairing mechanisms in this system under pressure, where several sc phases have also been discovered.

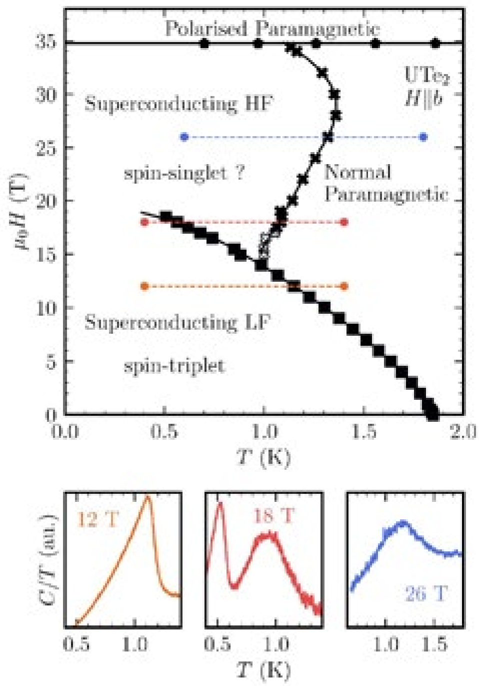

Figure 1: Two different superconducting phases in UTe_2 as observed by thermodynamic specific-heat measurements, showing the transition line between the two phases. At the bottom, the change of the specific-heat anomaly, becoming very broad in the high-field phase is very clear: note the curve at 18 T, where both anomalies are successively observed.

Field-Induced Tuning of the Pairing State in a Superconductor, A. Rosuel, C. Marcenat, G. Knebel, T. Klein, A. Pourret, N. Marquardt, Q. Niu, S. Rousseau, A. Demuer, G. Seyfarth, G. Lapertot, D. Aoki, D. Braithwaite, J. Flouquet, and J.P. Brison, Phys. Rev. X **13**, 011022 (2023).

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QUANTUM OSCILLATIONS IN THE SPECIFIC HEAT OF GRAPHITE REVEAL PHYSICS HIDDEN IN TEXTBOOKS

Z. Yang, Y. Kohama, ISSP, University of Tokyo, Japan and D. K. Maude, LNCMI Toulouse

We have investigated quantum oscillations in the electronic specific heat, C_{el}, in natural graphite. The crossing of a single spin Landau level at the Fermi energy gives rise to a double-peak structure (Figure 1a). Crucially, such a double peak is not observed in other thermodynamic probes. The hole and electron spin Landau levels involved are identified by numerically diagonalizing a Hamiltonian, which describes the band structure of graphite in a magnetic field. At lower temperatures, the splitting decreases, and the double-peak structure disappears below 90 mK (Figure 1b).

Intriguingly, the double-peak structure is predicted by text book theory, $C_{el}/T = k_B^2 \int D(E) (-x^2 df/dx) dx$ where $f(x)=1/(1 + e^x)$, $x = E/k_BT$, and k_B is the Boltzmann constant. The specific heat depends on the convolution of the Landau-level density of states (DOS), D(E), and a kernel term $-x^2df/dx$, which involves the first derivative of the Fermi-Dirac distribution function. The usual approximation (see textbooks, such as Kittel), removing D(E) from the integral to obtain the well-known formula $C_{el} = \pi^2 D(E_F) k_B^2T/3$, suppresses the double-peak structure which originates from the temperature-dependent splitting of the double maxima in the kernel term (Figure 1c). The calculated and predicted C_{el}/T are in excellent agreement (Figure 1d), notably they reveal the highly asymmetric DOS of three-dimensional Landau levels due to the van Hove singularity.

The kernel term represents a spectroscopic tuning fork of width $4.8k_BT$, which can be tuned at will to resonance. Using a coincidence method, the double-peak structure in the specific heat can be used to accurately determine the Landé g-factors of quantum materials. More generally, the tuning fork can be used to reveal any peak in the fermionic density of states which crosses the Fermi energy, such as for example Lifshitz transitions in heavy-fermion compounds.

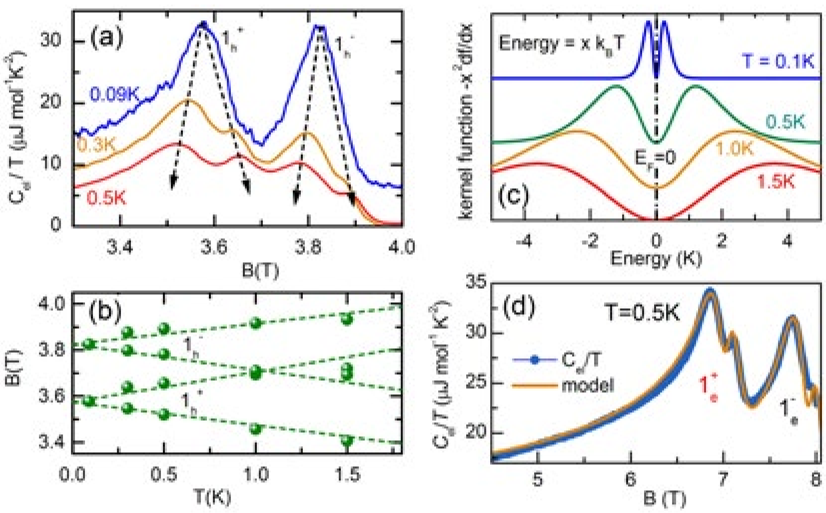

Figure: (a) Electronic specific heat divided by temperature C_{el}/T in graphite as a function of B, where the 1_h spin Landau levels cross the Fermi energy. (b) Magnetic-field position of the double-peak structure as a function of temperature. (c) The kernel term plotted versus $E = x\,k_BT$. Maxima occur at $x = \pm 2.4$ (d) Measured and calculated electronic specific heat C_{el}/T in graphite close to where the 1_e spin Landau levels cross the Fermi energy.

Unveiling the double-peak structure of quantum oscillations in the specific heat, Z. Yang, Y. Kohama, T. Nomura, T. Shitaokoshi, D. K. Maude, B. Fauqué, S. Kim, D. Chowdhury, Z. Pribulova, J. Kacmarcik, D. Aoki, A. Pourret, G. Knebel, T. Klein, and C. Marcenat, Nat. Commun. **14**, 7006 (2023).

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POSSIBLE ORIGIN OF HIGH-FIELD REENTRANT SUPERCONDUCTIVITY IN UTe_2

Toni Helm, HLD

The recent discovery of superconductivity (SC) in the heavy-fermion metal UTe_2 with a critical temperature of about 2 K triggered much excitement, as its critical field reaches values approaching those of high-T_c superconductors. Moreover, UTe_2 appeared very quickly as a potential candidate for topological spin-triplet SC that exhibits multiple unconventional superconducting phases under field or pressure. Spin-triplet SC is a rare phenomenon, expected to arise as a consequence of magnetic fluctuations in strongly correlated materials. It is characterized by a particularly high stability against external magnetic fields, since the Zeeman energy has no influence on the Cooper pairing. Indeed, a key characteristic of UTe_2 is an anisotropic upper critical field that exceeds the so-called Pauli limit along all field orientations.

For field aligned along the b axis, SC survives up to a metamagnetic transition at $\mu_0 H_m \approx 35$ T. The latter is associated with magnetic fluctuations that may be beneficial for the field-reinforced superconductivity surviving up to H_m. Once the field is tilted away from the b towards the c axis, a reentrant superconducting phase emerges just above H_m (see the phase diagram in Figure 1). In order to understand this remarkably field-resistant superconducting phase, an EMFL team together with researchers from Germany, France, and Japan conducted magnetic-torque and magnetotransport measurements in pulsed magnetic fields. They determined the record-breaking upper critical field of $\mu_0 H_{c2} \approx 73$ T and its evolution with angle. In their electrical-transport studies, they revealed that the normal-state Hall effect experiences a drastic suppression upon tilting the field away from the hard magnetic b axis. The minimum in the Hall effect is correlated with the maximum of H_{c2} of the high-field SC, as shown in Figure 2. This hints at a reduced band polarization above H_m in the angular range around 30° caused by a partial compensation between the applied field and an internal exchange field. This promotes the Jaccarino-Peter effect as a likely mechanism for the appearance of reentrant superconductivity above H_m.

Field-induced compensation of magnetic exchange as the possible origin of reentrant superconductivity in UTe_2, T. Helm, M. Kimata, K. Sudo, A. Miyata, J. Stirnat, T. Förster, J. Hornung, M. König, I. Sheikin, A. Pourret, G. Lapertot, D. Aoki, G. Knebel, J. Wosnitza, and J.-P. Brison, Nat. Commun. **15**, 37 (2024).

These results provide a guide for future experiments and theory that will show more quantitatively if and how reentrant SC may appear. Such a scenario puts specific constraints on the potential order parameter of the superconducting phase. Solving the riddle of how Cooper pairs, built by heavy quasiparticles, can survive in extreme magnetic fields will certainly help advance our fundamental understanding of unconventional superconductors.

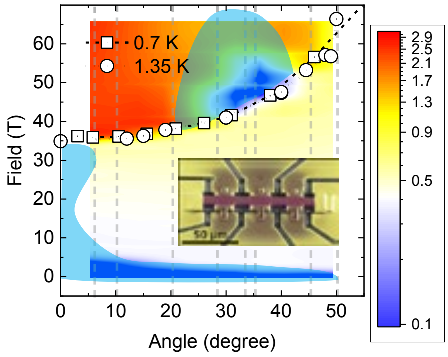

Figure 1: Contour plot created from magnetoresistance data (the color bar corresponds to the resistance in ohm). White squares and circles mark the metamagnetic transition field measured by pulsed-field torque magnetometry. Blue shaded regions indicate the superconducting phases. Inset: Microstructure fabricated from single crystals by focused-ion-beam patterning.

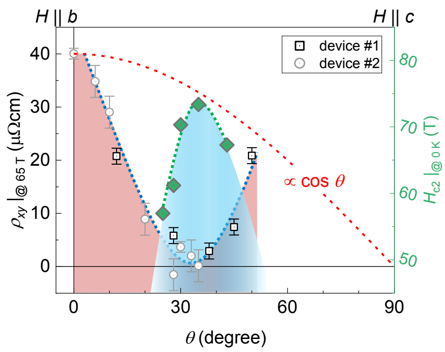

Figure 2: Angular dependence of the normal-state Hall resistivity at 65 T and 0.7 K of two microstructure devices. The blue dashed line is a guide to the eye that highlights the observed strong suppression around 30 – 35°. Green diamonds are H_{c2} values extrapolated to zero temperature. The red dashed line follows cos θ.

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OPENING OF THE 31TH CALL FOR ACCESS

On April 15, 2024, EMFL launched the 31st call for proposals inviting researchers worldwide to apply for access to one of the research infrastructures for high magnetic fields collaborating within EMFL.

The four facilities

> LNCMI - Grenoble - France: Static magnetic fields up to 36 T
> HFML - Nijmegen - the Netherlands: Static magnetic fields up to 38 T
> HLD - Dresden - Germany: Pulsed magnetic fields to beyond 95 T
> LNCMI - Toulouse - France: Pulsed magnetic fields of long duration to beyond 99 T and on the microsecond scale to beyond 200 T

run a joint proposal program, which allows full access to their installations and all accompanying scientific infrastructure to qualified external users, together with the necessary support from their scientific and technical staff.

Users may submit proposals for access to any of these installations by a unified procedure. You may find the online form for these proposals on the EMFL website.
www.emfl.eu/user

In the frame of the EU-funded ISABEL project, EMFL will continue to trial the novel **dual-access** procedure. Furthermore, EMFL will further proceed with the **first-time access** mode, with the aim of lowering the barrier for researchers to start using the EMFL facilities. Prospective users are encouraged to contact a staff member of EMFL who will be happy to provide support in preparing the proposals.

There are three more recent access modes within ISABEL: The novel **fast-track access** mode is permanently open. A convincingly urgent scientific case may be addressed as request to the EMFL Board of Directors (BoD). The BoD will evaluate the request and decide within typically two weeks, but may optionally consult one or more EMFL Selection Committee members and check the feasibility with the facility manager and the local contact. Further, users may apply for **technical-development access**, dedicated to the interest of scientists wishing to develop and improve technical installations and metrological procedures that could also be of interest to other EMFL users. A tailored **long-term access** mode was set up in order to meet the demand for schemes such as complex high-level science cases, which require a sequel of high-field experiments. If positively evaluated, the user will obtain an extended amount of access over a two- to three-year period. Proposals to the latter two access modes must be submitted during the regular call periods and will be evaluated by the BoD as a special category.

Please note that each experiment carried out must be followed by a progress report and a publication record filled out online on the EMFL website. Please be aware that this information will also be made available to the Selection Committee.

To improve our user program further, your feedback to the user committee is highly appreciated.
Please find the form on the EMFL website.
https://emfl.eu/SelCom/UserCommittee/feedbackform.php

The deadline for proposals for magnet time is May 15, 2024.

The EMFL Selection Committee will evaluate the proposals. Selection criteria are scientific quality (originality and soundness), justification of the need for high fields (are there good reasons to expect new results), and feasibility of the project (is it technically possible and are the necessary preparations done). We strongly recommended contacting the local staff at the facilities to prepare a sound proposal and ideally indicate a local contact.

Please do acknowledge any support under this scheme in all resulting publications with „We acknowledge the support of the HFML-RU (or HLD-HZDR or LNCMI-CNRS), member of the European Magnetic Field Laboratory (EMFL)." UK users should, in addition, add "A portion of this work was supported by the Engineering and Physical Sciences Research Council (grant no. EP/N01085X/1)."

> You may find more information on the available infrastructures for user experiments on the facility websites.

www.hzdr.de/hld
www.lncmi.cnrs.fr
www.ru.nl/hfml

EMFL
European Magnetic Field Laboratory

The EMFL develops and operates world class high magnetic field facilities, to use them for excellent research by in-house and external users.

THEVA

THEVA is Europe's sole manufacturer of second-generation high temperature superconducting (HTS) tape—a revolutionary electric conductor that exhibits zero resistance when cooled, offering unparalleled energy density.

Our mission is to empower industries and research efforts, driving advancements in energy transition, transportation, healthcare, and scientific exploration.

Leveraging expertise in superconductivity and proprietary technologies, we deliver superconductors for diverse applications, from energy generation and distribution to high-field magnets. Our customer base includes fusion startups, medical-equipment manufacturers, energy companies, and research facilities.

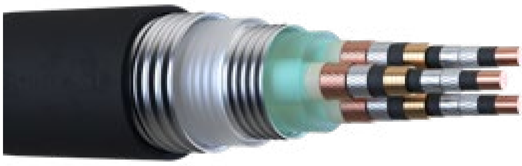
THEVA HTS wire

Headquartered in Munich, Germany, our production plant has an annual capacity of 120 kilometer for coated conductor, producing 12 mm wide wires. Our advanced production technology allows highest performance and quality standards utilized across various sectors.

In renewable energy, we played a pivotal role in the ECOSWING project, developing a superconducting generator for wind energy that enables a 40 % weight reduction and 25 % cost savings, while significantly reducing reliance on rare-earth metals.

Our involvement in the RoWaMag project led to the development of an efficient magnetic billet heater for extrusion plants using superconductors, cutting electrical losses by 30 % compared to traditional methods.

Expanding beyond fusion energy, we have ventured into power distribution by developing conductors for superconducting cables, which enhance electrical efficiency and grid flexibility.



The SuperLink project showcases our work with a prototype cable for a 12-kilometer, 110 kV power-distribution cable capable of over 500 MVA to be installed in the city grid of Munich.

In the scientific field, we are actively contributing to projects such as SuperEMFL and FASUM aiming to pioneer high-field magnets reaching up to 40 Tesla, thereby pushing the boundaries of magnetic-field research and expanding scientific exploration.

Within the medical domain, we maintain a leading position in the development of conductors tailored for high-field magnetic imaging. This ongoing effort serves to reinforce our role in facilitating intense magnetic-field applications, advancing scientific research, and fostering societal impact.

To meet future demands, we are currently working on expanding our production capacity to large industrial scale with the goal of multiplying our throughput by 25 in 2025.

Keep track of our news and achievements through our website:
www.theva.com

VIRTUAL TOURS OF THE EMFL LABORATORIES IN DRESDEN, TOULOUSE, AND GRENOBLE RELEASED

Virtual tours of the Dresden High Magnetic Field Laboratory (HLD), the LNCMI-Toulouse, and the LNCMI-Grenoble are now available, providing insights into the exciting world of research with high magnetic fields.

The tours are aimed at physics enthusiasts of all ages who want to find out more and gain an impression of the topics and processes at international research facilities. Furthermore, guest scientists can familiarize themselves with the infrastructure available at the laboratories in advance of their research stay.

For instance, during the HLD tour, visitors can interactively find out about the research being carried out, from the labs to the pulsed-field facilities and the large capacitor hall. They can follow how a coil for the highest magnetic fields is built. Further, scientists at the HLD provide insights into their current research projects and daily operations through brief videos. Popular demonstration experiments can also be seen on video for the first time, such as the „flying frying pan".

Enter the tours:

https://www.hzdr.de/hld360

https://lncmi.cnrs.fr/en/the-lncmi/

HMF-25 IN WARSAW

HMF 25 WARSAW 2024

The 25th International Conference on High Magnetic Fields in Semiconductor Physics (HMF-25) will be held in Warsaw, Poland from 16 to 20 September 2024 as a satellite conference to the International Conference on the Physics of Semiconductors (ICPS-2024, Ottawa, Canada). HMF-25 follows a series of biennial conferences, initiated by Gottfried Landwehr, in Würzburg, Germany, in 1972. Primarily focused on semiconductors and magnetic fields, the main topics of the conference have evolved with time and are now dominated, but not limited to current themes related to the physics of low-dimensional systems in conjunction with the application of magnetic fields.

The list of HMF-25 topics includes:

- graphene and 2D materials, nanostructures and heterostructures including magnetic materials,
- quantum Hall effect phenomena,
- quantum wells, dots, and wires,
- bulk semiconductors, topological phases, perovskites, and organic conductors,
- magneto-transport and magneto-spectroscopy,
- electron correlations and magnetic-field-driven phases,
- spin-dependent phenomena and non-equilibrium effects,
- novel phenomena and new techniques in high magnetic fields.

More information and the list of invited speakers can be found at:
https://hmf25.fuw.edu.pl

NEW TRANSFORMER AT LNCMI-GRENOBLE

September 28, 2023; arrival of the 60 MVA 225 kV/15 kV transformer from SIEMENS-Italy via the Fréjus tunnel.

The transformer and its heat exchangers in its dedicated building, ready for service to users.

A new transformer, financed by FEDER funds from the Auvergne-Rhône-Alpes region and the CNRS, has been installed on the CNRS campus in Grenoble. The Laboratoire National des Champs Magnétiques Intenses, one of the major research infrastructure of the CNRS, is now directly connected to the 225,000 V high voltage grid of RTE (Réseau de Transport d'Électricité or „Electricity Transmission Network").

With a power of 60 MVA, this transformer now increases the maximum power distributed to our magnets from 24 to 30 MW. Equipped with a new generation of a fast-response voltage regulator, this transformer allows for a better management of the network voltage during the magnetic-field sweeps, which are controlled by the researchers. The immediate benefit for the international community of users is a better stability and an increased safety margin during their experiments in very intense magnetic fields. Furthermore, ongoing tests and developments of magnets aim to increase the magnetic-field values available in different configurations taking advantage of this additional power now available.

Finally, the direct connection to a high-voltage level allows us to reduce joule losses and become a player in the regulation of the national electricity network. These are essential building blocks for working towards the long-term sustainability of our scientific activities.

UPCOMING EVENTS

1 International Conference on Science and Technology of Synthetic Electronics Materials 2024, Dresden, Germany, June 23-28, 2024.
https://icsm2024.de/

2 International Conference on Magnetism (ICM 2024), Bologna, Italy, June 30 - July 5, 2024.
https://www.icm2024.org/

3 Research in High Magnetic Fields (RHMF 2024), Nijmegen, The Netherlands, July 7-11, 2024.
https://www.hfml.ru.nl/RHMF2024/

4 International Conference on the Physics of Semiconductors (ICPS 2024), Ottawa, Canada, July 28 - August 2, 2024.
https://uottawacpd.eventsair.com/QuickEventWebsitePortal/icps2024/info

5 Applied Superconductivity (ASC 2024), Salt Lake City, USA, September 1-6, 2024.
https://www.appliedsuperconductivity.org/asc2024/

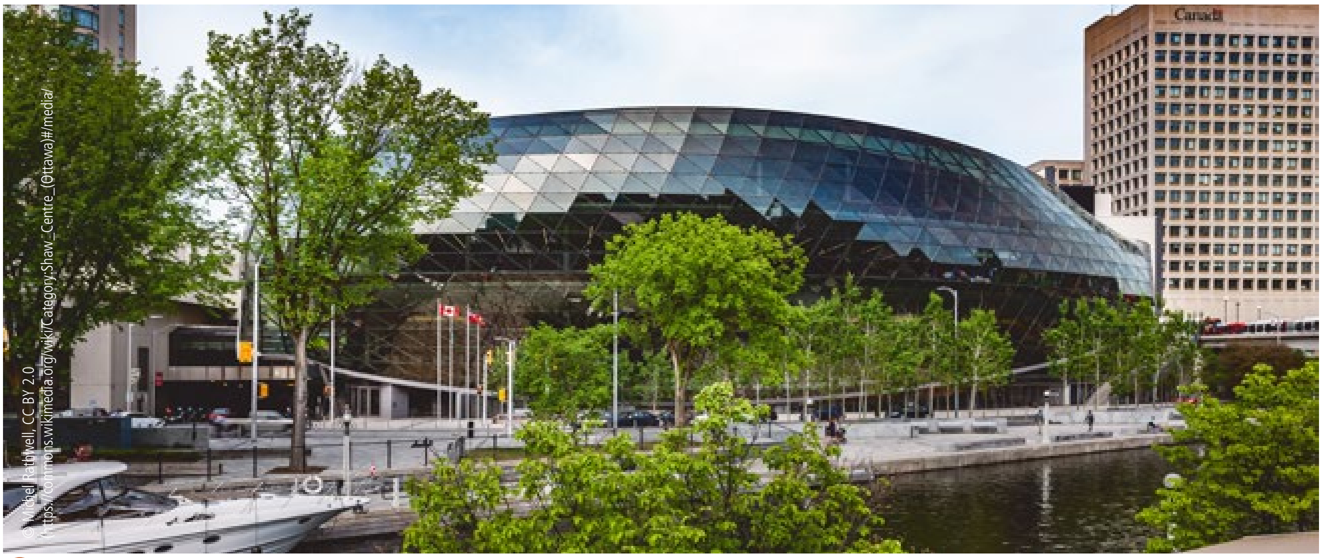
6 International Conference on Infrared, Millimeter, and Terahertz Waves, Perth, Australia, September 1-6, 2024.
https://www.irmmw-thz.org/conference/

7 25th International Conference on High Magnetic Fields in Semiconductor Physics (HMF-25), Warsaw, Poland, September 16 - 20, 2024.
https://hmf25.fuw.edu.pl/

8 International Symposium on Crystalline Organic Metals, Superconductors and Magnets (ISCOM 2024), Anchorage, USA, September 22 - 27, 2024.
https://sites.google.com/view/iscom2024/home

9 30th International Conference on Low Temperature Physics (LT30), Bilbao, Spain, August 7-13, 2025.
https://www.lt30.es/

Please save the following date:
EMFL User Meeting in Nottingham on Tuesday, June 11th.Further details and registration are available on the EMFL User Meeting conference website
https://indico.imapp.ru.nl/event/217/overview



The Shaw Centre, Ottawa

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